NOTES.

AT a recent meeting of the Paris Academy of Sciences, M. Berthelot reported that the total amount subscribed for the erection of a statue to Lavoisier was 98,000 francs. M. Barrias has been commissioned to construct the statue and the bas-reliefs for the pedestal. The Municipal Council of Paris has granted a site for the statue in an open space behind the Madeleine Church. The monument will be unveiled when the Paris Exhibition is open, probably some time in July.

THE Brussels Academy of Sciences has awarded the prize of six hundred francs, for an important contribution to geometry, to M. Léon Autonne, of the University of Lyon. The prize of six hundred francs for anatomical and systematic investigations of insects of the group Apterygota (Thysanura and Collembola) has been awarded to M. Victor Willem, of the University of Ghent. M. F. Keelhoff, of the same University, has been awarded the Prix Charles Lemaire (interest on twenty-five thousand francs) for a work entitled "Note sur le travail des forces élastiques." The decennial prize of five thousand francs for botanical science has been awarded to Prof. Alfred Cogniaux; and a prize of the same value for chemistry and physics has been given to Prof. Louis Henry. To fill vacancies caused by death, the Academy has elected as foreign associates in the section of mathematics and physics, Sir G. G. Stokes, Prof. Moissan and Prof. Jordan. In the section of natural sciences M. C. Vanlair has been elected a *membre titulaire*, Profs. Pelseneer and Gravis have been elected correspondents, and Sir John Murray and M. Maupas have been elected associates.

THE Berlin Academy of Sciences will celebrate the second centenary of its foundation on March 19 and 20, 1900.

THE annual meeting of the Australasian Association for the Advancement of Science will be opened at Melbourne on January 9, under the presidency of Mr. R. L. J. Ellery.

IN the December number of *Natural Science*, the announcement is made that the magazine is to be discontinued, the reason being insufficient support. The journal has always been of interest and value to students of the biological sciences, and it is to be regretted that financial considerations necessitate its withdrawal.

THE Council of the Manchester Literary and Philosophical Society have awarded the Wilde Medal for 1900 to Lord Rayleigh, for his contributions to mathematical and experimental physics and to chemistry; a Dalton Medal (struck in 1864) to Sir H. E. Roscoe, for his remarkable original researches in chemistry and for his distinguished services to scientific education; and the Wilde Premium for 1900 to Prof. A. W. Flux for his papers on economic questions read before the Society. The presentation of the medals and the premium will take place at a special meeting in February next, when Lord Rayleigh will deliver the Wilde Lecture for 1900.

A REUTER telegram from St. Petersburg states that the expedition of Baron Toll, organised for the exploration of the New Siberia Islands and Sannikoff Land, will set out in June next from a Norwegian port, whence it will proceed to the mouth of the Lena, on the banks of which river, at a point above the town of Yakutsk, it will pass the winter. During the summer of 1901 the expedition will begin its explorations towards the north, picking up *en route* a detachment which will be sent forward from the main body during March, with a sufficient supply of dogs.

THE death of Dr. John Frederick Hodges, professor of agriculture and lecturer on medical jurisprudence in Queen's College, Belfast, is announced in the *Times*. Dr. Hodges was an honorary member of the Academy of Agriculture of Sweden, and of many other scientific societies. He was one of the oldest members of the Chemical Society of London, having been elected a Fellow in 1844—three years after the formation of the Society. Dr. Hodges was the author of the following works:—"First Book of Lessons in Chemistry for Farmers and Teachers" (a work which reached a twelfth edition in 1862), "First Steps in Chemistry," "The Structure and Physiology of the Animals of the Farm," and of several papers published in the proceedings of scientific societies. He was for some years editor of the *Journal* of the Chemico-Agricultural Society of Ulster.

AT the international congress on tuberculosis recently held at Berlin (see vol. lx. pp. 108, 154) it was decided to hold a similar congress in England in 1901. A meeting was held in Gray's Inn Hall, on Monday, under the presidency of the Earl of Derby, to make preliminary arrangements for the forthcoming congress. The following resolutions were unanimously adopted:—(1) In view of the fact that tuberculosis, although a preventible disease, still devastates health and destroys lives in all parts of the world, this meeting, consisting of representatives of medical, veterinary, and sanitary science, and also principal officials of municipal and county authorities, is unanimously of opinion that it is desirable to hold a national congress on tuberculosis in the spring of 1901, to which representatives from India and all dependencies of the Empire should be invited, and, in addition, honoured guests from other countries. (2) That this meeting has learned with very great pleasure that H.R.H. the Prince of Wales has graciously consented to preside over the proposed congress, and to open it in person, and desires to convey to his Royal Highness the appreciation of all present of this expression of his sympathy and support. (3) That this meeting heartily approves of the steps already taken by the National Association for the Prevention of Consumption to initiate the undertaking, and earnestly invites the co-operation of representative bodies interested in the public health in carrying out the necessary organisation. (4) That this meeting is of opinion that steps should be at once taken to obtain subscriptions and to open a Congress Fund.

THE death is announced of Mr. E. C. C. Stanford, Fellow of the Institute of Chemistry and Chemical Society, and managing director of the British Chemical Company. Mr. Stanford introduced several original methods of chemical manufacture, and prepared a number of new bodies. From the *Chemist and Druggist* we learn that while he was an assistant to the late Prof. Redwood, he began a research on kelp and iodine manufacture; and afterwards delivered lectures on the subject before the Society of Arts. These brought him into notice, and the improved processes of manufacture which he had invented were adopted on a practical scale by Mr. Patterson, of Glasgow, with whom Mr. Stanford became associated, and under his direction the production of iodine at Clydebank became a very profitable industry until the advent of Chilian nitrate crippled it. Mr. Stanford's original idea for the manufacture of iodine was to extract the salts from seaweed by diffusion and without burning it. This was found to be impracticable on a large scale, and therefore he turned his attention to less wasteful production of kelp. Through his efforts the kelp-makers of Ireland and the Hebrides gradually improved the quality of their product, while the Norwegian kelp-makers under Mr. Stanford's instructions have produced a kelp richer in iodides and more suitable for treatment than either Irish or Scotch kelp. The monograph upon the iodine industry in Thorpe's "Dictionary of Applied Chemistry" was written by Mr. Stanford. Arising from his researches on the isolation of iodides from seaweeds by diffusion, he about fifteen years ago introduced into chemistry a new body called algin, the substance which gives seaweed its peculiar texture. This algin is an exceedingly viscous compound, and there appeared to be a future before it as a sizing-agent, but it never succeeded. One of Mr. Stanford's latest researches with the body was the preparation of an iron salt of it which has been found of considerable therapeutic interest, the compound being apparently more readily assimilated by the blood than any other iron compound. His last research was on the active principle of the thyroid gland, and it resulted in the isolation of thyroglandin. The results of this investigation were communicated to the meeting of the British Pharmaceutical Conference at Belfast.

THE Bavarian Government has granted a sum of 6000 marks to Dr. K. Giesenhagen for a botanical investigation of Malacca.

WE learn from the *Botanical Gazette* that Prof. R. von Wettstein, the director of the botanical garden at Vienna, has established a biological experiment station near the Bremerhütte, in the Gschnitzthal, in the Central Tyrolese Alps, at an elevation of 2300 m. The first object of research will be the production of species by direct adaptation.

THE United States Navy Board has issued a report on the results of investigations of the Marconi system of wireless telegraphy. The report is published in full in the *Electrician*, and from it the following statements concerning the efficiency of the system have been taken :—It is well adapted for use in squadron signalling under conditions of rain, fog, darkness and motion of speed. Wind, rain, fog, and other conditions of weather do not affect the transmission through space, but dampness may reduce the range, rapidity, and accuracy by impairing the insulation of the aërial wire and the instruments. Darkness has no effect. When two transmitters are sending at the same time, all the receiving wires within range receive the impulses from transmitters, and the tapes, although unreadable, show unmistakably that such double sending is taking place. In every case, under a great number of varied conditions, the attempted interference was complete. Mr. Marconi, although he stated to the Board before these attempts were made that he could prevent interference, never explained how nor made any attempt to demonstrate that it could be done. Between large ships (heights of masts 130 feet and 140 feet) and a torpedo-boat (height of mast 45 feet), across open water, signals can be read up to seven miles on the torpedo-boat and eighty-five miles on the ship. Communication might be interrupted altogether when tall buildings of iron framing intervene. The rapidity is not greater than twelve words per minute for skilled operators. The sending apparatus and wire would injuriously affect the compass if placed near it. The exact distance is not known, and should be determined by experiment. The system is adapted for use on all vessels of the navy, including torpedo-boats and small vessels, as patrols, scouts, and despatch boats, but it is impracticable in a small boat. For landing parties the only feasible method of use would be to erect a pole on shore and then communicate with the ship. The system could be adapted to the telegraphic determination of differences of longitude in surveying. The Board respectfully recommends that the system be given a trial in the navy.

THE great explosion which occurred in the central crater of Etna, on July 19, is by far the most striking phenomenon exhibited by the volcano since the eruption of 1892. According to Mr. S. Arcidiacono, who describes it in the last *Bollettino* (vol. v., No. 4) of the Italian Seismological Society, it exceeded in violence those which preceded the eruptions of 1886 and 1892. A gigantic "eruptive pine" rose to a height of more than 5000 metres above the summit of the mountain, and was then blown to the south-east into an elongated dark cloud, which covered a large part of the sky and hid the sun. Strangely enough, the great seismometrograph (25·3 metres in length), with which the observatory of Catania is now provided, was absolutely unaffected by the explosion. Three shorter tromometers showed, however, that it was preceded and followed by very slight and rapid vibrations ; and a slight earthquake, accompanied by a prolonged rumbling sound, was felt by a few persons at Zafferana Etnea. Six days later there was a second, but much less violent explosion, which produced no disturbance whatever in the instruments at Catania. The observatory on Mount Etna was unfortunately damaged by falling stones during the first explosion.

A PAPER was read by Mr. C. Newton Russell before the Institution of Civil Engineers on December 12, upon the subject of refuse destruction, particularly in reference to its employment for raising steam. Details were given of ten combined plants, the data of which all tend to prove that a considerable amount of energy in the form of heat may be obtained from the burning of ordinary domestic refuse. At Shoreditch, where the largest of these plants is in operation, the total amount of refuse destroyed during a period of twelve months was about 26,000 tons. The plant consists of six Babcock-Willcox water-tube boilers and twelve refuse-furnaces of the Manlove-Alliot type, each boiler being placed between two refuse-furnaces, the hot gases from which are led into the boiler-tubes through short side-flues, each boiler being provided with a special grate, on which coal might be burned if required. Forced-air draught is supplied to the fires by electrically-driven fans, the pressure in the ashpits being one inch of water. No coal or other fuel is mixed with the refuse, which burns freely ; the maximum temperature observed is 2500° Fahr., and the average, 1500° F. The steam generated in the boilers, at an average pressure of 140 lbs. per square inch, is disposed of mainly by the engines attached to the electric generators, although a small portion of live steam is supplied for clothes-washing purposes to the public baths and washhouses adjoining the electricity works ; exhaust steam is also supplied to the Baths and Free Library, which are entirely heated from the steam produced by the refuse-destructor.

IT may be interesting to some of our readers to know that the U.S. Weather Bureau has just issued a *Bulletin* (No. 27), showing the probable state of the sky along the path of total eclipse of the sun on May 28, 1900, so far as relates to the United States. The track of totality begins on the Pacific Ocean just west of Mexico at sunrise, and leaves the United States near Norfolk (Virginia), and Cape Henry. It then crosses the Atlantic Ocean, and touches Europe at Coimbra, Portugal, takes in Algiers and Northern Africa, and terminates near the northern end of the Red Sea at sunset. This is the third report, and includes the results of observations made in the years 1897–9. The observations are divided into two parts ; (1) the general state of the sky, and (2) the state of the sky near the sun, and show that Central Georgia and Eastern Alabama, about south of Atlanta, is the most favourable part for avoiding the tendency to cloudiness. It is, however, needless to remark that any special cyclonic disturbance on the day in question would seriously modify these calculations as to the mean amount of cloudiness.

IN *Das Wetter* for October, Dr. van Bebber publishes the first part of the results obtained in an interesting discussion on the possibility of scientific weather prediction for several days in advance, with special reference to the requirements of agriculture. Instead of attacking the subject in the usual way of dealing with the more mobile areas of low barometric pressure, he keeps in view the behaviour of the simpler and more persistent areas of high pressure, among which he distinguishes five principal types, in which an anticyclone lies (1) in the neighbourhood of the British Isles (with depressions lying to the eastward); (2) over Germany (with depressions at a considerable distance off); (3) over North or North-East Europe (with depressions to the southward); (4) over East or North-East Europe (with low pressure in the west); (5) over South and South-West Europe (with low pressure to the northward). Tables are given showing the frequency in days of the weather types during twenty years, and of their mean duration. The cases in which the high pressure is situated in the western half of the horizon are much more frequent than those in which it lies to the eastward, especially in the summer season. The distribution of pressure corresponding to type (4) is a winter type, and shows a decided minimum during summer. The occurrence of type (3) in April is very marked, and it is comparatively rare in the summer season. The duration of the different types varies considerably in the twenty years' period, but the average time is about three days. The chief characteristics of the various types is explained; but although these refer more particularly to the weather of the Continent, the lines on which the investigation has been carried out may probably be followed with advantage in other similar discussions.

In the number of the *Biologisches Centralblatt* for October 1, Dr. L. Reh, of Hamburg, contributes a discussion on symmetry and asymmetry in animals, in the course of which he disputes the correctness of several current views. It has, for instance, been asserted that asymmetry occurs only in land animals of a sluggish disposition and in aquatic creatures. But, observes the author, the majority of fishes are some of the most symmetrical of all animals; while in contrast to the unsymmetrical claws of land-crabs is the symmetry of those of their aquatic cousins. In regard to the occurrence of symmetry in rapidly moving creatures and of asymmetry in those of stationary habits, Dr. Reh admits that, so far as external characters are concerned, the former condition obtains in insects, most fishes and birds, while many tube-dwelling worms, univalve molluscs, and flat-fish are as markedly unsymmetrical. On the other hand, conspicuous asymmetry is met with in the intestines of birds and in the skulls of the toothed whales; while many barnacles, bivalve molluscs, and brachiopods are as distinctly symmetrical.

Captain Guido Couarde contributes to the *Mittheilungen* of the Vienna Geographical Society an interesting paper on the island of Mayotto, the member of the Comoro group nearest to Madagascar. A short history of the island is given, and notes on its trade, population, climate, flora, and fauna.

Petermann's *Mittheilungen* contains the first part of a detailed study of the geology of Celebes, by Prof. H. Bucking. The region described is that of Minahassa, in the extreme north-west of the island. Minahassa is remarkable for volcanic activity; there are large numbers of active volcanoes, solfataras, mud-volcanoes, and hot springs.

We have received the first part of the fifty-sixth volume of the *Verhandlungen des naturhistorischen Vereins der Preussischen Rheinlande, Westfalens, und des Reg.-Bezirks Osnabrück.* The general meeting for 1899 was held at Aix-la-Chapelle, and the report contains papers on "Eyes and Industry," by Dr. Thier, oculist in Aix; on the rainfall of the Rhine Province, by Dr. P. Polis; on the geology of volcanic islands, by Paul Grosser; and on the spiders of the Rhine Province, by W. Bosenberg.

The Hull Scientific and Field Naturalists' Club sends a copy of its *Transactions* for the year 1899. The club wisely confines its publications to local topics. Mr. J. W. Boult contributes a list of Macro-Lepidoptera collected within eight miles of Hull. Mr. Thomas Sheppard deals with the contents and origin of the gravels around Hull. Some of the gravels he regards as Pre-Glacial, although the evidence furnished by the mammalian remains is inconclusive. The mosses of the East Riding form the subject of an article by Mr. J. J. Marshall. Other papers relate to local water-supply, and to "A whale hunt at Goole over thirty years ago."

Appendix II. for 1899 of the Kew *Bulletin of Miscellaneous Information* consists of the names and origin of the new garden plants brought for the first time into cultivation during 1898, and the most noteworthy of those which have been re-introduced after being lost from cultivation. The list includes about 300 species.

Herr J. Dörfler (Barichgasse 36, Vienna iii.) is about to publish a second edition, revised and enlarged, of his *Botaniker Addressbuch* (Botanical Directory) and asks the co-operation of British botanists, who are requested to send him their full name and address, with their scientific distinctions or appointments, together with the special branch of botany in which they have worked. The price of the Directory will be, to subscribers 7*s.* 6*d.*, to non-subscribers, 10*s.* post free.

Bulletin No. 17 of the U.S. Department of Agriculture (Division of Vegetable Physiology and Pathology) consists of a report by Mr. Erwin F. Smith on the "Wilt disease" of cotton, water-melon, and cow-pea (*Vigna sinensis*). It appears to be due to the attacks of a fungus, which is polymorphic, assuming somewhat different forms in the three host-plants. Besides ascospores, it produces three different kinds of conidial reproductive bodies. The fungus has hitherto been known as *Fusarum vasinfectum*, but Mr. Smith regards it as the type of a new genus, *Neocosmospora*, allied to *Cosmospora*.

We have received a report on the spraying of Charlock and Runch (wild radish) issued conjointly by the Yorkshire College and the East and West Ridings Joint Agricultural Council. The writer, Mr. J. R. Campbell, advocates the destruction of these weeds by a spraying machine, the spray used being either iron sulphate or copper sulphate, preferably the former. It can, however, be used to advantage only in bright, sunny and calm weather. Solutions of the strength of 10 to 15 per cent. iron sulphate have no injurious effects on corn or young seeds, but they are injurious to other cruciferous crops, such as mustard or turnips, and to beans.

Early in the New Year Mr. John C. Nimmo will publish the first volume, by Prof. Sayce, of Oxford, of "The Semitic Series," an important new series of standard hand-books intended to present compactly and in popular scientific form a knowledge of the more important facts in the history, religion, government, language, customs, &c., of the Babylonians, Assyrians, and allied Semitic races of ancient history in a way that will be serviceable to the reading public generally, as well as to teachers and masters, students, the clergy, and others. The first volume is "Babylonians and Assyrians—Life and Customs (with special reference to the Contract Tablets and Letters)," by the Rev. A. H. Sayce, Professor of Assyriology at Oxford. Other volumes will follow at regular intervals; each will be complete in itself, and the series, taken as a whole, will neglect no phase of the general result of recent scientific research.

The additions to the Zoological Society's Gardens during the past week include a Flying Squirrel (*Sciuropterus*, sp. inc.) from Chitral, presented by Captain S. A. Harris, I.M.S.; a Pheasant (*Phasianus colchicus*, ♂) from Russia, presented by the Hon. E. A. Stoner; two Crossed Snakes (*Psammophis crucifer*), two Rhomb-marked Snakes (*Trimerorhinus rhombe-*

atus), two Cape Bucephalus (*Dispholidus typus*), a Puff Adder (*Bitis arietans*) from South Africa, presented by Mr. J. E. Matcham; a Common Rattlesnake (*Crotalus durissus*), two Horrid Rattlesnakes (*Crotalus horridus*) from North America, deposited; four Common Sheldrakes (*Tadorna cornuta*), two White-fronted Geese (*Anser albifrons*), European, purchased; a Harnessed Antelope (*Tragelaphus scripta*, ♀), a Brush-tailed Kangaroo (*Petrogale penicillata*, ♂), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

New Minor Planet (1899 E.Z.).—Circular No. 25 from the Centralstelle at Kiel contains an ephemeris of the planet observed by Mr. E. F. Coddington in October and November last. Herr Kreutz thinks there seems no doubt that this is identical with the planet found by Dr. J. Palisa (1896 C.O.), and the ephemeris is given with the possibility that more observations may definitely settle the point.

Ephemeris for 12h. Berlin Mean Time.

1899.	R.A. h. m. s.	Decl. ° ′
Dec. 22	... 0 58 39 ...	−4 59·0
24	... 1 0 45 ...	4 36·4
26	... 2 56 ...	4 13·3
28	... 5 12 ...	3 49·7
30	... 7 33 ...	3 25·8
Jan. 1 (1900)	1 10 0 ...	−3 1·5

Change in Publication of the "Astronomische Nachrichten."—We have received a card from Herr H. Kreutz, of the Central Bureau at Kiel, respecting an important alteration in the method of publishing the astronomical information hitherto given in the *Astronomische Nachrichten*, which is one of the most important foreign journals dealing with current astronomical observations. With the beginning of the New Year the original publication will be confined to the recording of general observations, while a separate paper will be issued to contain the ephemerides of comets, planets, &c. The subscription to the new part will be 10 marks yearly. Arrangements are being made for this addition at Kiel, Niemannsweg 103, and subscriptions should be sent there direct.

Companion to the Observatory.—We have received the *Companion to the Observatory* for the year 1900. In arrangement this closely resembles those of previous years, giving most of the more important data for the observation of celestial objects. Beginning with one page showing for every week the time of rising and setting of the sun, its declination at noon, mean and sidereal time, and the moon's phases, there follows a calendar, giving for every day in the year the setting, southing, declination of the moon and the longitude of its terminator. Mr. Denning again contributes his list of radiant points of the principal meteor showers during the year. Then follow useful particulars of the R.A., Decl., diameters, times of rising, southing and setting of the planets, with the times of elongation, opposition, conjunction, &c. Occultations, configurations of the satellites of Jupiter, Saturn, Uranus and Neptune occupy the next ten pages. Mr. Crommellin contributes an ephemeris of Eros for the period about the opposition in December. The rest of the book is occupied with an ephemeris for physical observations of the sun, and the mean places and times of maxima and minima, of the more noticeable variable stars.

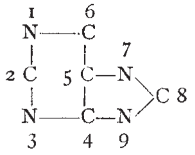
RECENT RESEARCHES ON URIC ACID.

The uninterrupted stream of new researches which has issued from the laboratory of Prof. Emil Fischer at Berlin since 1895 threatens to bewilder even the careful student of chemistry or physiology. The following brief summary of the results may be found useful.

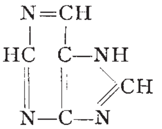
Uric acid is an excretory or waste product of animal life, and is closely related chemically to many substances such as paraxanthine and heteroxanthine, which are associated with it in urine; xanthine, adenine, and guanine, which probably form part of the nucleins of cells, and theobromine, theophylline and caffeine, the physiologically active constituents of tea, coffee and cocoa.

An accurate knowledge of the constitution of these substances is therefore of the first importance to physiologists, whilst a satisfactory process for utilising uric acid—which is a plentiful constituent of guano—in the synthesis of theobromine or caffeine would possess considerable therapeutic interest as well as commercial value. The many difficulties encountered by Prof. Fischer in the solution of these problems have been met with his accustomed skill and resource, which are the admiration and despair of the present-day chemist, and we are now not only in possession of a clear and complete knowledge of the relationship which exists between these complex products of animal and plant life, but we may anticipate before long their appearance as commercial products.

Fischer has shown that in all these compounds the same atomic framework is present and may be represented as follows, the relative position of the atoms being denoted by the numbers 1 to 9.

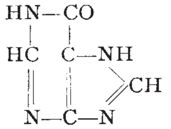


If the four additional hydrogen atoms necessary to satisfy the valencies of the carbon and nitrogen atoms be now added, the structure of the mother substance of the whole series is obtained, a compound which has been actually prepared by Fischer, and named *purine* (*purum uricum*).

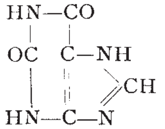


Purine.

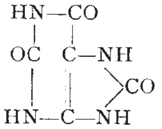
Hypoxanthine, xanthine and uric acid may be derived from purine by the addition of one, two and three oxygen atoms.



Hypoxanthine (6-oxypurine).

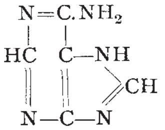


Xanthine (2 : 6-dioxypurine).

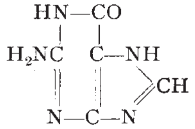


Uric acid (2 : 6 : 8-trioxypurine).

Adenine is purine in which the hydrogen atom in position 6 is replaced by an amido-group, whilst guanine is hypoxanthine with an amido-group in position 2.

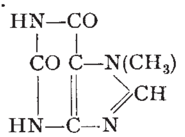


Adenine.

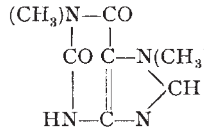


Guanine.

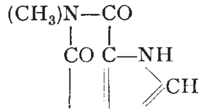
Heteroxanthine, theophylline, paraxanthine, theobromine and caffeine are respectively mono-, di- and tri-methyl xanthines.



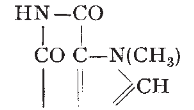
Heteroxanthine (7-methyl xanthine).



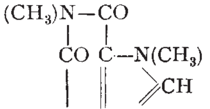
Paraxanthine (1 : 7-dimethyl xanthine).



Theophylline (1 : 3-dimethyl xanthine.)



Theobromine (3 : 7-dimethyl xanthine).



(Caffeine (1 : 3 : 7-trimethyl xanthine).